

**Notice of Allowability**

Application No.

10/054,499

Examiner

Michael P. Mooney

Applicant(s)

JIN ET AL.

Art Unit

2883

**- The MAILING DATE of this communication appears on the cover sheet with the correspondence address-**

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 1/18/05 Amdt.
2. ☒ The allowed claim(s) is/are 1-16.
3. ☒ The drawings filed on 22 January 2002 are accepted by the Examiner.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) ☐ All    b) ☐ Some\*    c) ☐ None    of the:
    1. ☐ Certified copies of the priority documents have been received.
    2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.  
**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
  - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
    - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
  - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date \_\_\_\_\_
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date \_\_\_\_\_
7. ☐ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other \_\_\_\_\_

### REASONS FOR ALLOWANCE

The following is an examiner's statement of reasons for allowance:

The prior art, either alone or in combination, does not disclose or render obvious a mirror layer for receiving light from the input fiber comprising a frame and at least one curved mirror comprising a metal-coated substrate movably coupled to the frame, the curved mirror having a maximum dimension less than 3000 micrometers and a radius of curvature less than 200 millimeters for reflecting and focusing light from the input fiber; and an actuation layer disposed adjacent the mirror layer comprising at least one actuator coupled to the curved mirror for controllably tilting the curved mirror to direct the reflected light onto the optical output fiber in combination with the rest of claim 1 for the reasons stated by Applicant in the Remarks section filed 1/18/05.

It is noted that the claim 1 is allowable because the unique combination of each and every specific element stated in the claim.

The prior art, either alone or in combination, does not disclose or render obvious a mirror layer comprising a frame and at least one curved mirror movably coupled to the frame, the curved mirror having a maximum dimension less than 3000 micrometers and a radius of curvature less than 200 millimeters, and an actuation layer disposed adjacent the mirror layer comprising at least one activator coupled to the curved mirror for controllably tilting the curved mirror, wherein the mirror layer comprising a metal coated substrate, the substrate having a thickness in the range 0.1 - 40 micrometers and the metal coating having a thickness in the range 5 nanometers to 5 micrometers in

It is noted that the claim 1 is allowable because the unique combination of each and every specific element stated in the claim.

The prior art, either alone or in combination, does not disclose or render obvious a mirror layer comprising a frame and at least one curved mirror movably coupled to the frame, the curved mirror having a maximum dimension less than 3000 micrometers and a radius of curvature less than 200 millimeters, and an actuation layer disposed adjacent the mirror layer comprising at least one activator coupled to the curved mirror for controllably tilting the curved mirror, wherein the mirror layer comprising a metal coated substrate, the substrate having a thickness in the range 0.1 - 40 micrometers and the metal coating having a thickness in the range 5 nanometers to 5 micrometers in

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combination with the rest of claim 4 for the reasons stated by Applicant in the Remarks section filed 1/18/05.

It is noted that the claim 4 is allowable because the unique combination of each and every specific element stated in the claim.

The prior art, either alone or in combination, does not disclose or render obvious a mirror layer comprising a frame and at least one mirror movably coupled to the frame, the mirror having a maximum dimension less than 3000 micrometers and a radius of curvature less than 200 millimeters; an actuation layer disposed adjacent the mirror layer comprising at least one actuator coupled to the mirror for controllably moving the mirror, wherein the mirror layer comprises a metal-coated substrate having a pair of major surfaces, a thickness in the range 0.1 - 40 micrometers, and dopants implanted in combination with the rest of claim 7 for the reasons stated by Applicant in the Remarks section filed 1/18/05.

It is noted that the claim 7 is allowable because the unique combination of each and every specific element stated in the claim.

The prior art, either alone or in combination, does not disclose or render obvious a method of making a device having a curved MEMS mirror providing a device having a mirror substrate with a maximum dimension less than 3000 micrometers, and implanting into the substrate in a surface region thereof, a sufficient concentration of dopants to curve at least a portion of the substrate to a radius of curvature less than 200 millimeters in combination with the rest of claim 9 for the reasons stated by Applicant in the Remarks section filed 2/2/04.

section filed 1/18/05.

It is noted that the claim 9 is allowable because the unique combination of each and every specific element stated in the claim.

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It is noted that the claim 9 is allowable because the unique combination of each and every specific element stated in the claim.

The prior art, either alone or in combination, does not disclose or render obvious a method of making including providing a device having a mirror substrate with a first thickness maximum dimension of less than 40 micrometers and a first coefficient of thermal expansion; coating the substrate with a coating of metal having a second thickness and a second coefficient of the thermal expansion; and heat treating the coated substrate to a temperature in the range 100-6000 C, the first and second coefficients and thicknesses and the heat treating temperature chosen to curve at least a portion of the coated substrate to a radius of curvature less than 200 millimeters in combination with the rest of claim 12 for the reasons stated by Applicant in the Remarks section filed 2/2/04.

It is noted that the claim 12 is allowable because the unique combination of each and every specific element stated in the claim.

The prior art, either alone or in combination, does not disclose or render obvious an optical system including: a 1<sup>st</sup> optical fiber (OF); a 2<sup>nd</sup> OF; and a curved MEMs mirror to direct light from the 1<sup>st</sup> OF to the 2<sup>nd</sup> OF, the MEMs mirror comprising a frame and at least one mirror movably coupled to the frame, an actuation layer disposed adjacent the mirror layer comprising at least one actuator coupled to the mirror for controllably moving the mirror; the mirror having a maximum dimension of less than 3000 micrometers and a radius of curvature of less than 200 millimeters in combination with section filed 2/2/04.

It is noted that the claim 13 is allowable because the unique combination of each and every specific element stated in the claim.

The prior art, either alone or in combination, does not disclose or render obvious

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the rest of claim 14 for the reasons stated by Applicant in the Remarks section filed 2/2/04.

It is noted that the claim 14 is allowable because the unique combination of each and every specific element stated in the claim.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

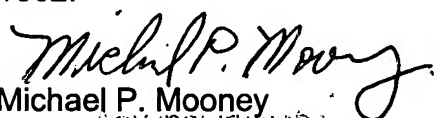
Application/Control Number: 10/054,499 **Conclusion**

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael P. Mooney whose telephone number is 571-272-2422. The examiner can normally be reached during weekdays, M-F.

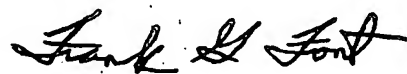
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank G. Font can be reached on 571-272-2415. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 571-272-1562.

  
Michael P. Mooney  
Examiner

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EGF/mpm  
2/12/05



Frank G. Font  
Supervisory Patent Examiner  
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the organization, the examiner should be directed to Michael P. Mooney whose telephone number is 571-272-2422. The examiner can normally be reached during weekdays, M-F.